

# MPM281 High Stability Pressure Sensor



## Features

- Pressure range -100kPa...0kPa~7kPa...100MPa
- Gauge, Absolute, Sealed gauge, Vacuum
- Constant current or constant voltage power supply
- Silicone/Fluorocarbon oil filling options, isolated construction, excellent medium compatibility
- $\Phi 19\text{mm}$  standard OEM pressure sensor
- Full stainless steel 316L
- Wide temp. compensation range  $-10^{\circ}\text{C} \sim 80^{\circ}\text{C}$
- Long-term stability  $\pm 0.1\%\text{FS}/\text{Year}$

## Applications

- Industrial process control
- Level measurement
- Gas, liquid pressure measurement
- Pressure gauge
- Pressure calibrator
- Hydraulic system and switches
- HVAC system
- Aviation and navigation inspection

## Introduction

MPM281 High Stability Pressure Sensor is a silicon piezoresistive sensitive element with isolated construction and temperature compensation. The sensor uses a high-reliability diffused silicon die encapsulated in a  $\Phi 19\text{mm}$  316L stainless steel housing. Precision compensation provides a wide temperature range and zero-point calibration. The measured pressure is accurately converted to an electrical signal via an isolated diaphragm. Fluorocarbon oil filling is available. It is tailored for pressure measurement in oxygen-rich conditions. MPM281 Pressure Sensor undergoes rigorous inspection and testing on the automated production line, suitable for demanding pressure measurement conditions.

## Electrical Performance

- Power supply:  $\leq 2.0\text{mA DC}$  (constant current type)  
 $\leq 10\text{V DC}$  (constant voltage type, on request)
- Electrical connection:  $\Phi 0.5\text{mm}$  Kovar pin or 100mm silicone wires
- Common mode voltage output: 50% input (typ.)
- Input impedance:  $2\text{k}\Omega \sim 8\text{k}\Omega$  (constant current type)  
 $4\text{k}\Omega \sim 25\text{k}\Omega$  (constant voltage type)
- Output impedance:  $3.5\text{k}\Omega \sim 6\text{k}\Omega$
- Response time (10%~90%):  $< 1\text{ms}$

## Construction Performance

- Diaphragm: Stainless steel 316L
- Housing: Stainless steel 316L
- Vent tube : Stainless steel 304
- Pin: Gold-plated kovar
- O-ring: FKM
- Net weight:  $\sim 16\text{g}$
- Oil filling: Silicone oil (default)/Fluorocarbon oil

## Environmental Conditions

- Vibration: No change at 10gRMS, (20~2000)Hz
- Shock: 100g, 11ms
- Medium compatibility: The gas or liquid which is compatible with stainless steel and FKM

## Basic Conditions

- Medium temperature: (35±1)°C
- Ambient temperature: (35±1)°C
- Vibration: 0.1g (1m/s<sup>2</sup>) Max
- Relative humidity: (50±10)%RH
- Ambient pressure: (86~106)kPa
- Power supply: (1.5±0.0015)mA DC

## Specifications

All specifications were tested under basic conditions.

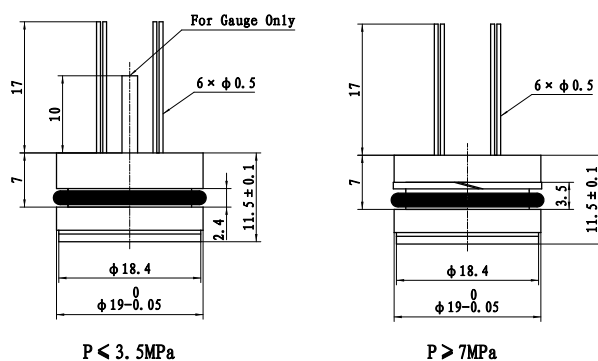
| Item                         | Min.   | Typ.        | Max.   | Units              | Notes |
|------------------------------|--------|-------------|--------|--------------------|-------|
| Pressure nonlinearity        |        | ±0.15       | ±0.2   | %FS, BFS           | 1     |
| Pressure repeatability       |        | ±0.03       | ±0.075 | %FS                |       |
| Pressure hysteresis          |        | ±0.03       | ±0.075 | %FS                |       |
| Zero output                  |        | ±1.0        | ±2.0   | mV DC              |       |
| Constant current output/span | 70     |             |        | mV DC              | 2     |
| Constant voltage output/span | 5      |             | 25     | mV/V               | 3     |
| Zero thermal error           |        | ±0.5        | ±1.0   | %FS, @35°C         | 4     |
| Span thermal error           |        | ±0.5        | ±1.0   | %FS, @35°C         |       |
| Compensation temp. range     | 0~70   |             |        | °C (≤35kPa)        |       |
|                              | -10~80 |             |        | °C (>35kPa)        |       |
| Long-term stability error    |        | ±0.15       | ±0.20  | %FS/Year (≤100kPa) |       |
|                              |        | ±0.10       | ±0.15  | %FS/Year (>100kPa) |       |
| Zero thermal hysteresis      | ±0.2   |             |        | %FS (≤100kPa)      | 5     |
|                              | ±0.15  |             |        | %FS (>100kPa)      |       |
| Insulation resistance        |        | 250         |        | MΩ@250V DC         | 6     |
| Lifetime                     |        | ≥10 million |        | cycles             |       |
| Operating temp. range        |        | -40~125     |        | °C                 |       |
| Storage temp. range          |        | -40~125     |        | °C                 |       |

1. P=35kPa, nonlinearity ≤±0.3%FS
2. Output/Span=full scale output - zero point  
P=7kPa, output/span ≥45mV, P=0.7bar, output/span ≥60mV
3. P=7kPa, output /span 3mV/V ~ 6mV/V
4. P=7kPa, zero thermal error≤1.5%FS
5. Within compensation temp. range
6. Insulation resistance was tested under RH≤65% and Temp.≤35 °C .

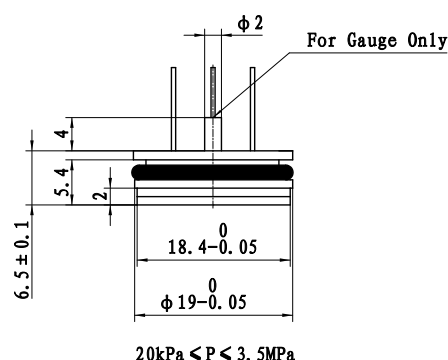
## Outline Construction

(Unit: mm)

MPM281 Type

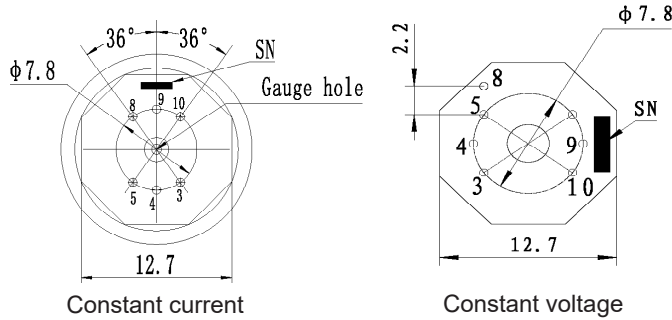


MPM281 Type II

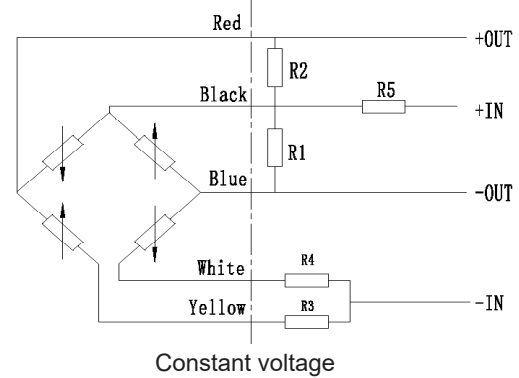
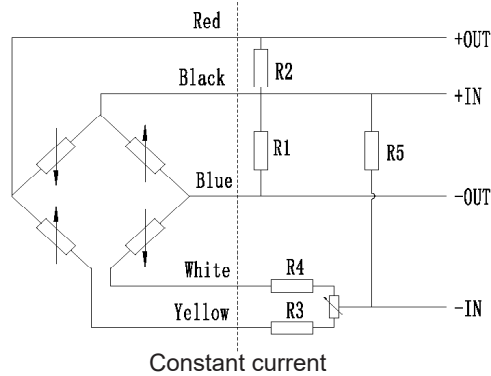


The recommended installation dimension is  $\phi 19^{+0.05}_{+0.02}$  mm

## Electrical Connection



| Pin | Range code<br>02/03/17/18/19/20 |            | Other range codes |            |
|-----|---------------------------------|------------|-------------------|------------|
|     | Definition                      | Wire color | Definition        | Wire color |
| 4   | -OUT                            | Blue       | +OUT              | Red        |
| 5   | -IN                             | Yellow     | -IN               | Yellow     |
| 8   | +IN                             | Black      | +IN               | Black      |
| 9   | +OUT                            | Red        | -OUT              | Blue       |



## Order Guide

### MPM281-09-G-F-L-1-P

| Code      | Size                                     |
|-----------|------------------------------------------|
| MPM281    | Φ19×11.5mm                               |
| MPM281 II | Φ19×6.5mm<br>Range:0kPa ~ 20kPa...3.5MPa |

| Range code | Pressure range | Ref.  | Over-pressure | Burst pressure |
|------------|----------------|-------|---------------|----------------|
| 0C         | 0kPa~7kPa      | G     | 250%FS        | 600%FS         |
| 0B         | 0kPa~20kPa     | G     | 250%FS        | 600%FS         |
| 0A         | 0kPa~35kPa     | G.A   | 250%FS        | 600%FS         |
| 02         | 0kPa~70kPa     | G.A   | 200%FS        | 500%FS         |
| 03         | 0kPa~100kPa    | G.A   | 200%FS        | 500%FS         |
| 07         | 0kPa~200kPa    | G.A   | 200%FS        | 500%FS         |
| 08         | 0kPa~350kPa    | G.A   | 200%FS        | 500%FS         |
| 09         | 0kPa~700kPa    | G.A   | 200%FS        | 500%FS         |
| 10         | 0MPa~1MPa      | G.A   | 200%FS        | 500%FS         |
| 12         | 0MPa~2MPa      | G.A   | 200%FS        | 500%FS         |
| 13         | 0MPa~3.5MPa    | G.A.S | 200%FS        | 500%FS         |
| 14         | 0MPa~7MPa      | S.A   | 200%FS        | 400%FS         |
| 15         | 0MPa~10MPa     | S.A   | 150%FS        | 300%FS         |
| 17         | 0MPa~20MPa     | S.A   | 150%FS        | 200%FS         |
| 18         | 0MPa~35MPa     | S.A   | 150%FS        | 200%FS         |
| 19         | 0MPa~70MPa     | S.A   | 150%FS        | 200%FS         |
| 20         | 0MPa~100MPa    | S.A   | 110%FS        | 150%FS         |

|                                              |                               |
|----------------------------------------------|-------------------------------|
| Code*                                        | Potting                       |
| Code P                                       | No potting                    |
| Code RTV                                     | Potting with silicone RTV gel |
| * This option is not available for MPM281 II |                               |

| Code | Electrical connection |
|------|-----------------------|
| 1    | Kovar pin             |
| 2    | 100mm silicone wires  |

| Code                                         | Compensation                                                                                           |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------|
| L                                            | Temperature compensation (1.5mA excitation)                                                            |
| LCV1*                                        | Laser trimming, 10V DC excitation                                                                      |
| M                                            | Without temperature compensation, capable of providing resistance compensation value(1.5mA excitation) |
| * This option is not available for MPM281 II |                                                                                                        |

| Code | Sealing    |
|------|------------|
| 0    | Null       |
| F    | FKM O-ring |

| Code | Pressure type                                                |
|------|--------------------------------------------------------------|
| G    | Gauge                                                        |
| A    | Absolute                                                     |
| S    | Sealed gauge                                                 |
| GY0  | Withstand vacuum pressure while Zero at atmospheric pressure |
| GY   | Withstand vacuum pressure while Zero at -100kPa              |

### Notes

1. The default unit of the product is kPa.  $1\text{kPa}=0.01\text{bar}$ .
2. Zeo shift: Range code 0B can be shifted to -5kPa, -10kPa or -20kPa; 0A can be shifted to -10kPa or -20kPa; 02 can be shifted to -35kPa, -50kPa, or -70kPa; 03~13 can be shifted to -100kPa.
3. It is recommended that the sensor be assembled as a "suspended" construction to avoid direct pressure on its face and affecting sensor stability.
4. Protect the isolated diaphragm and ceramic circuit board to prevent any damage or low performance.
5. The FKM O-ring of sensor has a temperature range of  $-20^{\circ}\text{C}\sim 250^{\circ}\text{C}$  by default. For operating temperature below  $-20^{\circ}\text{C}$  or harsh media, please contact the MICROSENSOR.